

REMARKS

In the Office Action dated September 8, 2004, the Examiner provides a number of objections and rejections. Each of these issues will be separately addressed in the same order as addressed by the Office Action.

Specification

The Office Action observed a number of informalities related to the specification. Specifically, Paragraphs 11, 13, 18, 20, 21, 22, and 27 were observed having informalities. The enclosed amendments to the specification address each of these informalities and adopts the recommended language provided by the Examiner, where provided.

Drawings

The Office Action observes that a reference character was not mentioned in the description, namely, 206 in Figure 7 while reference numerals 146 and 178 were provided in the description without such reference in any of the drawings. Proposed replacement drawing sheets are provided to address the informalities for numerals **146** and **178**. Reference character **206** was added to the specification in paragraph 35 where it was inadvertently omitted.

Claim Rejections 35 USC § 102

Claims 1, 4-8, 10-13, 15, 16, 18 and 19 are rejected as being anticipated by Santos, U.S. Patent No. 3,747,592. Santos shows a retractor having arms having a curved segment extending intermediate the rack up until linear portions are encountered which support the blades. The portions of these linear segments which are closest to the rack may obscure view of the use of the portions of the linear segment farther away from the rack. As can be seen from the Santos reference, the purpose of the curved segments is to allow for the operation of

the retractor which is located intermediate the two arms to provide space for the operation of this retractor.

The applicant uses the curved arms to provide retractor clamps which can be moved along the curved arms at desired locations above the surgeon. Both the independent claims, namely, claims 1 and 15 have been amended to require that a retractor clamp be selectively positionable along the curved segment at least one of a plurality of locations. This is not possible in the Santos reference since the retractor blade clamp can only be located in the single location along the linear portions. Accordingly, as affected by the enclosed amendment, claims 1-20 are now believed to be allowable and such action is respectfully requested.

Conclusion

As affected by the enclosed amendment, the applicant believes that the claims 1-20 are now allowable and such action is respectfully requested. No additional claims have been added and no additional independent claims have been created. Accordingly, no additional fees are believed to be due with this response.

Respectfully submitted,

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***** VERSION SHOWING CHANGES MADE *****

1. (Currently Amended) A surgical retractor comprising:

a rack having a proximal and distal portion;

a first arm connected to a first location on the rack having an end spaced from the first location defining a length therebetween;

a second arm having a housing for slidably engaging a portion of the rack and an end spaced from the housing defining a length therebetween, said second arm selectively positionable on the rack intermediate the proximal and distal portions, said second arm having a continuously curved segment intermediate the housing and the end; ~~and~~

said housing having an adjustment mechanism for allowing the positioning of the housing relative to the rack at a desired location and the at least temporary fixation of the housing at the desired location; and

a retractor clamp selectively positionable along the curved segment at one of a plurality of locations.

2. (Original) The surgical retractor of claim 1 wherein the continuously curved segment of the second arm spans the length of the second arm.

3. (Original) The surgical retractor of claim 2 wherein the continuously curved segment has a constant rate of curvature.

4. (Original) The surgical retractor of claim 1 wherein the continuously curved segment is concavely oriented toward the first arm.

5. (Original) The surgical retractor of claim 1 wherein the first and second arm are at least substantially coplanar.

6. (Original) The surgical retractor of claim 5 wherein the rack is substantially coplanar with the first and second arms.

7. (Original) The surgical retractor of claim 1 wherein the first arm further comprises a housing for slidably engaging a portion of the rack and an end spaced from the housing defining a length therebetween, said first arm selectively positionable on the rack intermediate the proximal end and distal end, said first arm having a continuously curved segment intermediate the housing and the end; and

said housing having an adjustment mechanism for allowing the positioning of the housing relative to the rack at a desired location and the at least temporary fixation of the housing at the desired location on the rack.

8. (Original) The surgical retractor of claim 7 wherein the continuously curved segment of the first arms is concavely oriented relative to the second arm.

9. (Original) The surgical retractor of claim 1 wherein the continuously curved segment extends at least substantially the length of the second arm.

10. (Original) The surgical retractor of claim 1 wherein the continuously curved segment extends at least one third of the length of the second arm.

11. (Original) The surgical retractor of claim 10 wherein the continuously curved segment extends at least one half of the length of the second arm.

12. (Original) The surgical retractor of claim 1 wherein the first arm has a continuously curved segment intermediate the first location and the end, said continuously curved segment extending at least one third of the length of the first arm.

13. (Original) The surgical retractor of claim 12 wherein the continuously curved segment of the first arm extends at least one half the length of the first arm.

14. (Original) The surgical retractor of claim 13 wherein the continuously curved segment extends at least substantially the length of the first arm.

15.(Currently Amended) A surgical retractor comprising:

 a rack having a proximal and distal portion;

 a first arm connected to a first location on the rack having an end spaced from the first location defining a length therebetween, said first arm having a continuously curved segment intermediate the housing and the end extending at least one third of the length;

a second arm having a housing for slidably engaging a portion of the rack and an end spaced from the housing defining a length therebetween, said second arm selectively positionable on the rack intermediate the proximal and distal portions; ~~and~~

said housing having an adjustment mechanism for allowing the positioning of the housing relative to the rack at a desired location and the at least temporary fixation of the housing at the desired location; and

a retractor clamp selectively positionable along the curved segment at one of a plurality of positions.

16. (Original) The surgical retractor of claim 15 wherein the continuously curved segment of the first arm extends at least one half the length of the first arm.

17. (Original) The surgical retractor of claim 16 wherein the continuously curved segment extends at least substantially the length of the first arm.

18. (Original) The surgical retractor of claim 15 wherein the second arm has a continuously curved segment extending at least one third of the length of the second arm.

19. (Original) The surgical retractor of claim 18 wherein the continuously curved segment of the second arm extends at least one half the length of the second arm.

20. (Original) The surgical retractor of claim 19 wherein the continuously curved segment of the second arm extends substantially the length of the second arm.

*****VERSION SHOWING CHANGES MADE*****

[00011] Retractor clamps are utilized with the frame and may be connected to either the arms or the rack itself. Some retractor clamps are adapted to fit ~~slide~~ into position and need not necessarily have any other connecting mechanism to secure the clamp to the arm or rack. Other clamps have a retaining clip which may be spring biased to hold the clamp in a desired location on the arm or rack. Some clamps maintain a mount in a fixed position. Other clamps have mounts which are pivotable relative to their connection on the arm or rack. The rack or other portion of the system may then be connected to a bed rail or vertical post connected to the operating table or other fixture to fixedly secure the position of the retractor system components. The pivoting feature allows the mount to lift or push retractor blades into or out of an incision. The retractor clamps may be connected to a retractor handle and then to a blade. When the tissue is retracted to a desired position, the clamp is then secured to an arm or rack. The handle may then be disconnected from the blade.

[00013] The particular features and advantages of the invention as well as other objects will become apparent from the following description taken in connection with the accompanying drawings in which:

Fig. 1 is a top plan view of a retractor frame of a presently preferred embodiment of the present invention;

Fig. 2. is a top plan view of a first alternatively preferred embodiment of the retractor frame of the present invention;

Fig. 3a is a top plan view of a second alternatively preferred embodiment of the retractor frame of the present invention with two retractor clamps connected thereto;

Fig. 3b is a back side plan view of the rack used in the retractor frame of Figure 3a;

Fig. 4a is a top plan view of a third alternatively preferred embodiment of the retractor frame of the present invention with an extension arm connected thereto;

Fig. 4ab is a side perspective view of the extension arm shown in Figure 4a;

Fig. 5 is top plan view of a fourth alternatively preferred embodiment of the retractor frame of the present invention;

Fig. 6 is a side plan view of an arm of the fourth alternatively preferred embodiment in an unlocked position;

Fig. 7 is a side plan view of a preferred retractor clamp of the present invention;

Fig. 8 is a side plan view of the retractor clamp of Fig. 7 with the mount pivoted downwardly;

Fig. 9 is a side plan view of the retractor clamp of Fig. 7 with the mount pivoted upwardly;

Fig. 10 is a top plan view of the retractor clamp of Fig. 7.

Fig. 11 is a side plan view of a first alternatively preferred retractor clamp of the present invention;

Fig. 12 is a side plan view of a second alternatively preferred retractor clamp of the present invention;

Fig. 13 is a top plan view of the retractor clamp of Fig. 12;

Fig. 14 is a side plan view of a retractor blade for use in the present invention;

Fig. 15 is a top plan view of the retractor blade end shown in Figure 14.

Fig. 16 is top plan view of an alternatively preferred retractor blade end.

Fig. 17 is a side plan view of the retractor blade end of Fig. 16;

Fig. 18 is a side plan view of a handle for use with the retractor blades of Fig. 15-17.

and

Fig. 19 is a perspective view of a surgical retractor system in use.

[00018] In Figure 2, since the rack has multiple radii arc segments, the angle between first and second axes 44,46 is not solely dependent upon spacing between the arms 38,40. While the three axes 44,46,48 are substantially equally spaced from one another where they intersect the rack 32, the angle between the first and second axes 44,46 is about 15 degrees while the angle between the second and third axes 46,48 is about forty five degrees. In other embodiments, the radii of arc segments may be different which of course would affect the angular relationship of the arms 38,40 as the spacing between the arms is increased or decreased.

[00020] Figure 3a shows an alternatively preferred embodiment of the preferred invention which shows some of the versatility of the retractor system described herein. Retractor 50 has a fixed arm 52 and a moveable arm 54. Unlike the hinged and straight arms shown in Figures 1 and 2, the arms 52,54 are curved along their length. This structure is believed to assist for certain shaped incisions. The rate of curvature may vary along the length, however the embodiment shown shows a relatively constant rate of curvature. The rack 56 may be substantially linear as illustrated, or could be curved as shown in Figures 1, 2 and 3b. The arms 52,54 as well as the rack 56 may be provided with retractor clamps 58,60. Although the clamps are shown on the first arm 52, they may also be placed on the second arm 54 or the rack 56. The arms 52,54 may either have a smooth back 62, or a scalloped back 64 depending upon the needs of the user and the particular components to be utilized with the retractor frame 50. Of course, some racks 56 can be dome shaped or curved as shown in Figure 3b as well as curved as shown in Figures 1 and 2 so that they are curved in more than two dimensions. The Adoming@ of the rack 56 has been found helpful in getting the ends 57,59 out of a surgeon=s way in some procedures.

[00021] Figures 4a and 4b ~~has~~ have been provided to illustrate a particular accessory for use with retractor frames, such as with a traditional frame 70 or any of the improved frames shown in Figures 1-3 or others. The extension arm 72 is believed to be a new development in the field of components utilized with retractor frames 70. The extension arm 72 may provide a surgeon the ability to provide substantially 360 degree coverage about an incision for locations to place a retractor clamp, and thus direct a retractor into an incision. This flexibility provides the surgeon with numerous options to provide a retracted incision while minimizing any impediments to his vision or ability to work within the incision.

[00022] Depending on the needs of the surgeon, the extension arm 72 may be substantially planar with the arms or it may elevate a support surface 74 above the arm, illustrated as first arm 76. It is connected so that the support surface 74 may pass over, or under, the second arm, such as second arm 78. Of course the extension arm 72 may be connected to the second arm 78 instead of the first arm 76 as illustrated. Additionally, the extension arm 72 may be equipped with a housing 80 which may either secure the extension arm 72 to an arm 76,78 or it may be somewhat similarly constructed as the housing 82 on either the first or second arms 76,78 to allow the surgeon or assistant to retract tissue away from the rack 84. Additionally, the extension 74 is illustrated as having a curved and/or domed support surface 74, however it could be straight, angled or otherwise constructed such as in a manner illustrated for the racks and arms shown herein. The use of the extension arm 74 is believed to be a huge improvement over the technique shown in U.S. Patent No. 5,795,291, incorporated by reference, which requires using two retractor frames. Furthermore, the system utilized may be secured to a fixed support such as a vertical post 300, a rail of an operating table or other appropriate location as shown in Figure 19.

[00027] The interior workings of the housing **100** are also illustrated in Figure 6. While other devices are known in the art, the housing **100** has a driver **126** actuated by a handle **128**. The driver **126** illustrated is a wheel with spokes **130** adapted to fit within slots **132** shown in Figure 5. Release lever **134** may ~~act~~ allow the driver **126** to act as a ratchet to move in only one direction when in the normally biased position illustrated, or it may be depressed to disengage the driver **126** from the slots **132** to allow the arm **96** to be positioned at the will of the user of the rack **92**.

[00035] Figure 14 shows a retractor blade **200** which has a head **202** and a contact surface **204**. Although the contact surface **204** is illustrated as a “Höhmänn” contact surface which is shown in detail in Figure 15, Figures 16 -17 show a “Hayes” contact surface **206**. Of course other retractor blade contact surfaces which resemble paddles or other structures may also provide a contact surface for various uses. The head **202** may take on a number of shapes and is adapted to work with the selected mount of the clamp which will be utilized to retain the retractor blade.